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Reaction Control System (RCS) - Malfunction symptoms 1 - 8 hand drawn diagrams

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APOLLO OPERATIONS HANDBOOK

SYMPTOM	PROCEDURE	REMARKS																		
<p>1. RCS</p> <p>YELLOW 12 on 12 He tank press 1700 psi (Sys A/B)</p> <p>1a. He press low-as seen</p>	<p>1 Check press • RCS TEMP/PRESS MON - HE Estimate press <1700?</p> <p>NO → 2 C/WEA FAILURE</p> <p>YES → 3 RCS qty norm?</p> <p>NO → 4 He press <1400?</p> <p>YES → 5 HELIUM LEAK → 6 Shut down failed system when prop press reaches 100 psi • RCS SYS (both r.p.) MAIN SOV - CLOSE • RCS CSFDF - OPEN</p> <p>YES → 7 HE PRESS TRANSDUCER FAILED</p>	<p>1 He press off when RCS TEMP/PRESS MON is cycled to HE</p>																		
<p>1b. PQMD abnormal</p>	<p>8 Check PQMD and He press • RCS TEMP/PRESS MON - HE • He press norm?</p> <p>YES → 10 PQMD FAILED IN AFFECTED SYS</p> <p>NO → 9 Fuel leak Affected RCS SYS: • 12 - RCS SYS QUAD 1, 2, 3, 4 - OPEN • RCS SYS QUAD 1, 2, 3, 4 - CLOSE (16-18) • RCS SYS MAIN SOV - CLOSE (if r.p.) • Record He press • RCS TEMP/PRESS MON - FUEL or PQMD MAIN SOV</p> <p>press seen? YES → 11 PROPELLANT MAIN LEAK (BETWEEN MAIN SOV AND ISOL VALS) → CAUTION RCS CSFDF must remain closed to avoid loss of propellant from good reactions</p> <p>NO → 12 For affected sys, RCS SYS QUAD - OPEN individually prop MAIN press seen? YES → 13 PROPELLANT LEAK DOWNSTREAM OF ISOL VALS OR ISOL VALS FAILED OPEN → 14 Reco figure • RCS SYS QUAD - CLOSE (associated with leak) • Remaining RCS SYS QUAD - OPEN • RCS (low) SYS MAIN SOV - OPEN (if r.p.) • 12 - RCS SYS QUAD - CLOSE except for failed TCA</p> <p>NO → 15 Check He press RCS TEMP/PRESS MON - HE He press down from step 9? YES → 16 ABNORMAL USAGE OF SYS(A) PROPELLANT → 19 Shut down failed sys when prop press reaches 100 PSI • RCS SYS (both r.p.) MAIN SOV - CLOSE • RCS CSFDF - OPEN (if r.p.)</p> <p>NO → 17 HE/PROP LEAK (C/WEA MAIN SOV) → 18 Check He press • RCS SYS MAIN SOV - OPEN (if r.p.) • 12 - RCS SYS QUAD 1, 2, 3, 4 - CLOSE</p>	<p>2 Translation capability lost in the following also for loss of RCS SYS A/B</p> <table border="1"> <thead> <tr> <th></th> <th>A LOSS</th> <th>B LOSS</th> </tr> </thead> <tbody> <tr> <td>(1) TONS loss +Z, -Z</td> <td>+Z, -Z</td> <td>+Z, -Z</td> </tr> <tr> <td>(2) -Y</td> <td>-Y</td> <td>+Y</td> </tr> <tr> <td>(3) AGS loss +Z, -Z</td> <td>+Z, -Z</td> <td>+Z, -Z</td> </tr> <tr> <td>(4) -Y</td> <td>-Y</td> <td>+Y</td> </tr> <tr> <td>(5) -X</td> <td>-X</td> <td>+X</td> </tr> </tbody> </table> <p>The following conditions apply to the notes above:</p> <ol style="list-style-type: none"> (1) PWS will not command any to fire (2) Translation totally lost (3) RCS thrusters will fire but it will rotate as well as translate (4) Translation totally lost (5) Translation lost unless XTREME 20 is set to FUEL when 2 get trans will result. <p>3 Use RCS qty in unaffected system to estimate failed qty</p> <p>4 If He press <1400 psi leak is helium. If >1400, source of leak cannot be identified</p>		A LOSS	B LOSS	(1) TONS loss +Z, -Z	+Z, -Z	+Z, -Z	(2) -Y	-Y	+Y	(3) AGS loss +Z, -Z	+Z, -Z	+Z, -Z	(4) -Y	-Y	+Y	(5) -X	-X	+X
	A LOSS	B LOSS																		
(1) TONS loss +Z, -Z	+Z, -Z	+Z, -Z																		
(2) -Y	-Y	+Y																		
(3) AGS loss +Z, -Z	+Z, -Z	+Z, -Z																		
(4) -Y	-Y	+Y																		
(5) -X	-X	+X																		
<p>2. RCS press, or temp abnormal</p>	<p>1 Check unit • RCS TEMP/PRESS - circle Unit responds? YES → 2 Check RCS qty • Check each affected RCS qty • Qty low-as seen?</p> <p>NO → 1 RCS A(B) TEMP OR PRESS INDICATOR FAILED</p> <p>YES → 3 abnormal sensor? TEMP → 5 SYS A and SYS B TEMPS equal? YES → 7 COLD OR HOT SOAK → 8 Don't fire thrusters if RCS prop temp >100°F <40°F</p> <p>NO → 4 PRESS OR TEMP INST FAILURE</p>	<p>1 Propellant temp indicated only in the PRPWOT position (pointer drops to 20°F in the pos). Use RCS 12 for low He press and RCS A/B 12s for higher low manifold press.</p> <p>2 Use prop temp of unaffected sys to estimate prop temp of failed sensor. Use PQMD to estimate He press. Use alt press. (Propellant FUEL or OXID MAIN) to estimate press of failed sensor.</p>																		

G&N MALFUNCTION
SCS MALFUNCTION
SPS MALFUNCTION
RCS MALFUNCTION
EPS MALFUNCTION
T/C MALFUNCTION
ECS MALFUNCTION
SEQ MALFUNCTION

APOLLO OPERATIONS HANDBOOK

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**G&N
MALFUNCTION**

SCS MALFUNCTION

SPS
MALFUNCTION

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EPS
MALFUNCTION

T/C
MALFUNCTION

ECS ALFUNCTION

SEQ ALFUNCTION

RCS
master
pro 3,4,5

REMARKS

SYMPTOM

SYMPTOM

APOLLO OPERATIONS HANDBOOK

SYMPTOM	PROCEDURE	REMARKS
<p>1. ASC PRESS</p> <p>RED</p> <p>2 on up: FUEL or OXID press < 120 psi</p> <p>2 on up press < 2775 (airfare staging only)</p>	<p>1 APS firing?</p> <p>YES → 2 Burns mission critical?</p> <p>NO → 3 Shutdown APS • ENG STOP pb - push • ENG ARM - QEE • ABCET STAGE pb - RESET • ASC HE PRESS (2) - CLOSE</p> <p>NO → 4 Check Ind staged?</p> <p>YES → 5 Check Ind • ASC HE PRESS (2) - CLOSE • REPLUT TEMP/PRESS MON - ASC FUEL or OXID press low?</p> <p>NO → 6 Both FUEL and OXID press low?</p> <p>YES → 7 HE TANK LEAK</p> <p>NO → 8 CHECKER OR INST FAILED</p> <p>9 HE/PROP LEAK</p> <p>10 Check Ind • ASC HE PRESS (2) HE (2) HE PRESS • HELIUM MON - PRESS, PRESS2 CHECK HE press < 2775 psi?</p> <p>YES → 11 APS pressurized?</p> <p>NO → 12 Press decr either tank</p> <p>YES → 13 HE LEAK UPSTREAM OF REG BOV</p> <p>NO → 14 OR FTO press • REPLUT TEMP/PRESS MON - ASC FUEL or OXID press decr?</p> <p>YES → 15 HE/PROP LEAK</p> <p>NO → 16 HE PRESS INST FAIL OR HE LEAK BETWEEN REAS AND CK VALVS</p> <p>17 3 APS burn observed • ASC HE PRESS (2) - OPEN just before burn</p> <p>18 Press decr either tank?</p> <p>NO → 19 OR HE TEMP • HELIUM MON - TEMP1, TEMP2 He temp?</p> <p>YES → 20 HE PRESS INST FAILURE OR FLOW HE CK</p> <p>21 HE TANK LEAK</p> <p>22 • ED ASC HE PRESS - TANKS OR TANKS Closed tank</p> <p>23 COLD SOAK OR FLOW HE LEAK</p> <p>24 OR FTO press • REPLUT TEMP/PRESS MON - ASC FUEL or OXID press < 120 psi?</p> <p>YES → 25 APS pressurized?</p> <p>NO → 26 FUEL or OXID press decr?</p> <p>YES → 27 FUEL or OXID temp low?</p> <p>YES → 28 C/WEA FAILURE</p> <p>NO → 29 FUEL or OXID press decr?</p> <p>YES → 30 HE/PROP LEAK</p> <p>NO → 31 COLD SOAK</p> <p>32 CHECKER OR PRESS INST FAILURE</p>	<p>① 4 on monitoring of APS fuel and oxid press lock</p> <p>② Source of this leak cannot be identified and if press, advised to be hazardous.</p> <p>③ HE supply will deplete if both signals were fixed.</p> <p>④ HSTN conducting ground between these two failures possibility of light coming on due to low fuel/oxid temp before press</p> <p>⑤ Do not burn APS if Δt between Fuel/Oxid is > 10° or if temp < 40°</p>
<p>2. FUEL or OXID Temp abnormal</p> <p>240°F 250°F FUEL or OXID ΔT > 10°</p> <p>2a. FUEL or OXID press abnormal</p> <p>> 203 psi < 170 psi FUEL or OXID ΔP > 10°</p> <p>Unpress Fuel < 160 Oxid < 140</p>	<p>1 FUEL or OXID temp abnormal actual?</p> <p>YES → 2 FUEL (OXID) press abnormal hi or low?</p> <p>NO → 3 TEMP INST FAILURE OR COLD SOAK</p> <p>4 Check Ind • REPLUT TEMP/PRESS MON - PRESS1, PRESS2 press remains same?</p> <p>YES → 5 FUEL or OXID temp abnormal hi or low?</p> <p>NO → 6 HEAT SOAK OR COLD SOAK</p> <p>7 INDICATOR FAILURE</p> <p>8 Close Range • ASC HE PRESS (2) - CLOSE</p> <p>9 APS ASC PRESS LT</p>	

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APOLLO OPERATIONS HANDBOOK

SYMPTOM	PROCEDURE	REMARKS
<p>3. HE PRESS abnormal or slow</p> <p>>3500 <2775 (unpress)</p>	<p>1. Ch Ind • Check HE PRESS Ind response?</p> <p>2. press?</p> <p>3. Ch HE Temp HE Temp hi?</p> <p>4. PRESS INST FAILURE</p> <p>5. INDICATOR FAILURE</p>	
<p>3a. HE Temp abnormal</p> <p>>80°F <60°F</p>	<p>6. Temp?</p> <p>7. HE press low in door?</p> <p>8. Close Regs • ASC HE PRESS - CLOSED</p> <p>9. HE press hi?</p> <p>10. TEMP INST FAILURE</p> <p>11. HEAT SOAK</p> <p>12. ASC PRESS</p>	
<p>4. ASC QTY</p> <p>YELLOW flown when trans time 10 sec</p>	<p>1. APS firing?</p> <p>2. Turn APS/RES Instrument</p> <p>3. Shut down APS • ENG STOP - pull • R/S MAIN SOV • AFS - OPEN • RCS SYS A and B • ASC FEED IF 2 - CLOSE</p> <p>4. PROPELLANT LEAK</p> <p>5. CWEA OF FAILURE</p> <p>6. CWEA or INSTRUMENTATION FAILURE</p>	
<p>5. ASC HI RES</p> <p>YELLOW lit on of He manifest press >220 psi</p>	<p>1. Close Regs • ASC HE PRESS - CLOSE • ORBIT TEMP/PRESS MON-ASC • FUEL FLOW MON > 220 psi</p> <p>2. ASC HE RES FAILED OPEN (DOUBLE FAILURE)</p> <p>3. When FUEL FLOW press < 220 psi • ASC HE RES 1 and 2 - OPEN individually to isolate failed leg</p> <p>4. CWEA/INST FAILURE</p> <p>5. ORBIT TEMP/PRESS MON-ASC - OPEN</p>	
<p>6. ASC HE RES 1(2) to -dp</p>	<p>1. ASC HE RES 1(2) - OPEN</p> <p>2. HE RES SOV UNLATCHED</p> <p>3. TE/INST FAILURE OR HE RES SOV FAILED CLOSED</p>	<p>① MSFN can distinguish between these two failures</p>

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APOLLO OPERATIONS HANDBOOK

SYMPTOM	PROCEDURE	REMARKS
<p>1. DES REG</p> <p>Warning: Regulated He press < 220 psia > 260 psia</p>	<p>1. DPS <i>Warning?</i></p> <p>YES → 2. Surf Press & Temp</p> <p>• DES HE REG 1(2) - <i>close</i></p> <p>• DES HE REG 2(1) - <i>close</i></p> <p>• PROPUIT TEMP/PROS MON - DES 1(2)</p> <p>• MON - DES 1(2)</p> <p>• Prep press? <i>LOW</i></p> <p>NO → 3. DES REG <i>off?</i></p> <p>YES → 4. CHIEF/INST <i>DES REG 1(2)</i></p> <p>NO → 5. DES REG 1(2) <i>FAILED</i></p> <p>6. CHIEF/INST <i>DES REG 1(2)</i></p> <p>7. HE/PROP LEAK</p> <p>8. Shutdown DPS</p> <p>• ENG STOP pt - <i>push</i></p> <p>• WAIT 3 SEC</p> <p>• ENG ARM - <i>OFF</i></p> <p>• Verify PROCT pt - <i>close</i></p> <p>• DES HE REG 2(1) - <i>close</i></p> <p>9. CHIEF/INST <i>DES REG 1(2)</i></p> <p>10. CHIEF/INST <i>DES REG 1(2)</i></p> <p>11. CHIEF/INST <i>DES REG 1(2)</i></p> <p>12. CHIEF/INST <i>DES REG 1(2)</i></p> <p>13. CHIEF/INST <i>DES REG 1(2)</i></p> <p>14. CHIEF/INST <i>DES REG 1(2)</i></p> <p>15. CHIEF/INST <i>DES REG 1(2)</i></p> <p>16. CHIEF/INST <i>DES REG 1(2)</i></p> <p>17. CHIEF/INST <i>DES REG 1(2)</i></p> <p>18. CHIEF/INST <i>DES REG 1(2)</i></p> <p>19. CHIEF/INST <i>DES REG 1(2)</i></p> <p>20. CHIEF/INST <i>DES REG 1(2)</i></p> <p>21. CHIEF/INST <i>DES REG 1(2)</i></p> <p>22. CHIEF/INST <i>DES REG 1(2)</i></p> <p>23. CHIEF/INST <i>DES REG 1(2)</i></p> <p>24. CHIEF/INST <i>DES REG 1(2)</i></p> <p>25. CHIEF/INST <i>DES REG 1(2)</i></p> <p>26. CHIEF/INST <i>DES REG 1(2)</i></p> <p>27. CHIEF/INST <i>DES REG 1(2)</i></p> <p>28. CHIEF/INST <i>DES REG 1(2)</i></p> <p>29. CHIEF/INST <i>DES REG 1(2)</i></p> <p>30. CHIEF/INST <i>DES REG 1(2)</i></p> <p>31. CHIEF/INST <i>DES REG 1(2)</i></p> <p>32. CHIEF/INST <i>DES REG 1(2)</i></p> <p>33. CHIEF/INST <i>DES REG 1(2)</i></p> <p>34. CHIEF/INST <i>DES REG 1(2)</i></p> <p>35. CHIEF/INST <i>DES REG 1(2)</i></p> <p>36. CHIEF/INST <i>DES REG 1(2)</i></p> <p>37. CHIEF/INST <i>DES REG 1(2)</i></p> <p>38. CHIEF/INST <i>DES REG 1(2)</i></p> <p>39. 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CHIEF/INST <i>DES REG 1(2)</i></p> <p>86. CHIEF/INST <i>DES REG 1(2)</i></p> <p>87. CHIEF/INST <i>DES REG 1(2)</i></p> <p>88. CHIEF/INST <i>DES REG 1(2)</i></p> <p>89. CHIEF/INST <i>DES REG 1(2)</i></p> <p>90. CHIEF/INST <i>DES REG 1(2)</i></p> <p>91. CHIEF/INST <i>DES REG 1(2)</i></p> <p>92. CHIEF/INST <i>DES REG 1(2)</i></p> <p>93. CHIEF/INST <i>DES REG 1(2)</i></p> <p>94. CHIEF/INST <i>DES REG 1(2)</i></p> <p>95. CHIEF/INST <i>DES REG 1(2)</i></p> <p>96. CHIEF/INST <i>DES REG 1(2)</i></p> <p>97. CHIEF/INST <i>DES REG 1(2)</i></p> <p>98. CHIEF/INST <i>DES REG 1(2)</i></p> <p>99. CHIEF/INST <i>DES REG 1(2)</i></p> <p>100. CHIEF/INST <i>DES REG 1(2)</i></p>	<p>1. If it is available when indicated and after DES REG has been placed to DES for the next time, the DES REG should be closed (eng or manual) before the next time it is closed.</p> <p>2. If DES REG fails open (pda 7260), the DES REG must be closed within 5 sec to prevent 30V from passing open and damaging cable.</p> <p>3. DES REG can be damaged between the two failures.</p> <p>4. Causes Amb He Spent blown.</p> <p>5. He Reg Blowing of test.</p> <p>6. Cause of this leak cannot be identified and if possible, it could be repaired.</p> <p>7. DES HE will leak when the reg are opened.</p>

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SYMPTOM	PROCEDURE	REMARKS
<p>2. FUEL/Oxid lamp abnormal</p> <p>> 75°F < 55°F FULL/Oxid at > 25°F</p>	<p>1. Check lamp • FUEL/Oxid TEMP DES MON - ASC ALL Temp and base normal?</p> <p>YES → 2. Δt between Fuel/Oxid (or) model < 10°F?</p> <p>NO → 5. INDICATOR FAILED</p> <p>YES → 3. HEAT SOAK OR COLD SOAK</p> <p>NO → 6. FUEL/Oxid TEMP INST FAILURE</p> <p>4. Remove it if possible the lamp is fused. Temp will go down itself before a SPS leak.</p>	<p>① DES 1 TANKS are located at T1-Z. DES 2 TANKS are located at T1-Z.</p> <p>② Use in affected lamp to get temp of fuel/oxid tank.</p>
<p>3. He Press abnormal</p> <p>Supervisory and time limit Ambient > 1750 < 1310 degrees too precise</p>	<p>1. Check lamp • HEAT/TEMP DES MON - ASC ASQ gas & temp correct?</p> <p>YES → 2. Check lamp • DES HE REG (2) - CLOSE</p> <p>NO → 4. INDICATOR FAILURE</p> <p>2. Check lamp • DES HE REG (2) - CLOSE</p> <p>3. Check lamp • DES HE REG (2) - CLOSE</p> <p>4. Check lamp • DES HE REG (2) - CLOSE</p> <p>5. Check lamp • DES HE REG (2) - CLOSE</p> <p>6. Check lamp • DES HE REG (2) - CLOSE</p> <p>7. Check lamp • DES HE REG (2) - CLOSE</p> <p>8. Check lamp • DES HE REG (2) - CLOSE</p> <p>9. Check lamp • DES HE REG (2) - CLOSE</p> <p>10. Check lamp • DES HE REG (2) - CLOSE</p> <p>11. Check lamp • DES HE REG (2) - CLOSE</p> <p>12. Check lamp • DES HE REG (2) - CLOSE</p> <p>13. Check lamp • DES HE REG (2) - CLOSE</p> <p>14. Check lamp • DES HE REG (2) - CLOSE</p> <p>15. Check lamp • DES HE REG (2) - CLOSE</p> <p>16. Check lamp • DES HE REG (2) - CLOSE</p> <p>17. Check lamp • DES HE REG (2) - CLOSE</p> <p>18. Check lamp • DES HE REG (2) - CLOSE</p>	<p>① DES REG 11 and FUEL/Oxid press only indications of abnormal He press.</p> <p>② MSFN can distinguish between these failures.</p> <p>③ Source of this leak cannot be identified and if propagation could be hazardous.</p> <p>④ He supply will not be depleted while DES REGs closed. Open DES REGs just prior to the burn.</p> <p>⑤ If the DES REG 11 comes on, the failure is on the leak upstream of the check valve.</p> <p>⑥ If the Amb He gauge reads are forced, suspect it will be lost then the same leak.</p>
<p>4. DES REG 10 trip</p> <p>Abnormal when reg used</p>	<p>1. DES HE REG (10) - CLOSE then OPEN</p> <p>2. DES HE REG (10) - CLOSE then OPEN</p> <p>3. DES HE REG (10) - CLOSE then OPEN</p> <p>4. DES HE REG (10) - CLOSE then OPEN</p> <p>5. DES HE REG (10) - CLOSE then OPEN</p> <p>6. DES HE REG (10) - CLOSE then OPEN</p> <p>7. DES HE REG (10) - CLOSE then OPEN</p> <p>8. DES HE REG (10) - CLOSE then OPEN</p> <p>9. DES HE REG (10) - CLOSE then OPEN</p> <p>10. DES HE REG (10) - CLOSE then OPEN</p> <p>11. DES HE REG (10) - CLOSE then OPEN</p> <p>12. DES HE REG (10) - CLOSE then OPEN</p> <p>13. DES HE REG (10) - CLOSE then OPEN</p> <p>14. DES HE REG (10) - CLOSE then OPEN</p> <p>15. DES HE REG (10) - CLOSE then OPEN</p> <p>16. DES HE REG (10) - CLOSE then OPEN</p> <p>17. DES HE REG (10) - CLOSE then OPEN</p> <p>18. DES HE REG (10) - CLOSE then OPEN</p>	<p>① He reg 10 trip may be known. Failure can be confirmed by des FUEL/Oxid and des REG 10. If DES REG 2 is not opened.</p>
<p>5. DES REG 201 trip-gray</p> <p>gray abnormal when reg not used</p>	<p>1. DES HE REG (201) - OPEN then CLOSE</p> <p>2. DES HE REG (201) - OPEN then CLOSE</p> <p>3. DES HE REG (201) - OPEN then CLOSE</p> <p>4. DES HE REG (201) - OPEN then CLOSE</p> <p>5. DES HE REG (201) - OPEN then CLOSE</p> <p>6. DES HE REG (201) - OPEN then CLOSE</p> <p>7. DES HE REG (201) - OPEN then CLOSE</p> <p>8. DES HE REG (201) - OPEN then CLOSE</p> <p>9. DES HE REG (201) - OPEN then CLOSE</p> <p>10. DES HE REG (201) - OPEN then CLOSE</p> <p>11. DES HE REG (201) - OPEN then CLOSE</p> <p>12. DES HE REG (201) - OPEN then CLOSE</p> <p>13. DES HE REG (201) - OPEN then CLOSE</p> <p>14. DES HE REG (201) - OPEN then CLOSE</p> <p>15. DES HE REG (201) - OPEN then CLOSE</p> <p>16. DES HE REG (201) - OPEN then CLOSE</p> <p>17. DES HE REG (201) - OPEN then CLOSE</p> <p>18. DES HE REG (201) - OPEN then CLOSE</p>	<p>① Both Amb He and the gauges around blown</p>

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SPS MALFUNCTION

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T/C MALFUNCTION

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SEO MALFUNCTION

APOLLO OPERATIONS HANDBOOK

SYMPTOM	PROCEDURE	REMARKS
<p>6</p> <p>DLS QTY</p> <p>RED</p> <p>LT on of:</p> <p>Burn time to prop depletion < 2 min at 25% thrust</p>	<p>1 DPS eng firing?</p> <p>NO</p> <p>3 CWEA FAILURE</p> <p>2 OK Prop gty</p> <p>• PERCENT QTY MON - DES 1 9</p> <p>DES 2</p> <p>FUEL or OXID gty < 6%</p> <p>NO</p> <p>4 CWEA OF LIQUID LOW LEVEL SENSORS IN PROP TK FAILED CU</p> <p>3</p> <p>5 PROPELLANT LEAK OR DEGRADED ENG PERFORMANCE</p> <p>6 Shutdown DP</p> <p>• ENG STOP at peak</p> <p>• RNT 5 sec</p> <p>• EVAP RM - OFF</p> <p>7</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p>	<p>1 Light inhibited when DPS eng not firing when staged and when PROPELLANT QTY MON is OFF</p> <p>2 Monitor of low gty and test. Use PRE/POST warnings</p> <p>3 Low level indications is erroneous monitor PRE/OXID warning</p>
<p>7</p> <p>PQGS and abnormal</p>	<p>1 DPS firing?</p> <p>NO</p> <p>9 abnormal indication?</p> <p>BOTH ZERO</p> <p>11 PQGS CONTROL UNIT FAILED</p> <p>ONE ZERO</p> <p>12 PERCENT QTY - other DES RS</p> <p>PQGS norm?</p> <p>YES</p> <p>13 QTY PROBE IN AFFECTED TK FAILED</p> <p>14 PROPELLANT QTY MON - Good</p> <p>NO</p> <p>15 SIGNAL LINE TO IND LOST</p> <p>2 OK GEL DANCE</p> <p>• PERCENT QTY MON - other DES position</p> <p>FUEL or OXID QTY norm</p> <p>NO</p> <p>5 Both FUELS > 5% difference both OXIDS?</p> <p>YES</p> <p>6 PROPELLANT LEAK</p> <p>7 Shutdown DP</p> <p>• ENG STOP at peak</p> <p>• Wait 3 sec</p> <p>• EVAP RM - OFF</p> <p>• ABORT if - LIQUID</p> <p>• DES 1 & DES 2 - CLOSE</p> <p>3</p> <p>10 PQGS INDICATOR FAILED</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p>	<p>1 Qty residuals are reliable only under ex conditions. Fuel readings may indicate up to 6% low for approx 10 min after initial turn on.</p> <p>PQGS duty cycle is 45 min on / 15 min off.</p> <p>2 Use good estimate gty of failed tank</p> <p>3 DES QTY warning is unsatisfied</p> <p>4 DES QTY warning it may be insensitive</p> <p>5 Use PRE/OXID estimate gty of failed fuel system</p>
<p>8</p> <p>FUEL/OX norm the abnormal</p> <p>abnormal of: gty refers to fuel reading by during vent</p>	<p>1 abnormal during venting?</p> <p>NO</p> <p>3 FUEL (OXID) VENT - CLOSE</p> <p>th. leg?</p> <p>YES</p> <p>6 FUEL (OXID) SOV TRANSIENT</p> <p>NO</p> <p>7 FUEL (OXID) SOV FAILED OPEN</p> <p>9 th. FAILED</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p>	<p>1 Not applicable to gaseous conditions</p>

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